

Clean Copy of the Pending Claims

28. A method for making an electrode, comprising the steps of:

- a) providing a substrate having a surface to be coated;
- b) contacting at least a portion of the substrate surface with a first layer consisting of at least one of the metals selected from the group consisting of titanium, vanadium, zirconium, niobium, molybdenum, hafnium, tantalum, and tungsten in an elemental form;
- c) contacting a second layer to at least a portion of the first layer, wherein the second layer is selected from the group consisting of a carbide, a nitride, and a carbonitride of the same metal as the at least one metal of the first layer; and
- d) contacting a third layer comprising an iridium-containing material to at least a portion of the second layer to provide the electrode.

29. The method of claim 28, further comprising etching the substrate prior to contacting the first layer thereto.

30. The method of claim 29, wherein etching the substrate includes RF sputter etching the substrate.

31. The method of claim 29, wherein etching the substrate is performed in an argon rich atmosphere.

32. The method of claim 28, wherein providing the first layer includes DC sputtering with titanium.

33. The method of claim 32, wherein DC sputtering with titanium is performed in an argon rich atmosphere.

35. The method of claim 28, wherein providing the second layer includes DC sputtering in a nitrogen rich atmosphere.

36. The method of claim 35, wherein DC sputtering in the nitrogen rich atmosphere occurs while an RF bias is applied to the substrate.

37. The method of claim 35, wherein DC sputtering in the nitrogen rich atmosphere occurs for a period of time while an RF bias is applied to the substrate, and then for a period of time while no RF bias is applied to the substrate.

38. The method of claim 28, wherein providing the third layer is performed using an RF sputter chamber.

41. A method for making an electrode, comprising the steps of:

- a) providing a substrate;
- b) applying an RF bias to the substrate;
- c) DC sputtering a first layer contacted to at least a portion of the substrate being subjected to the RF bias to provide a coated substrate, the first layer comprised of a material selected from the group consisting of a carbide, a nitride, and a carbonitride of at least one of the metals selected from the group consisting of titanium, vanadium,

zirconium, niobium, molybdenum, hafnium, tantalum, and tungsten; and

d) providing a second layer comprising an iridium-containing material covering at least a portion of the first layer to provide the electrode.

42. A method for making an electrode, comprising the steps of:

- a) providing a substrate contained in a nitrogen rich atmosphere;
- b) applying an RF bias to the substrate;
- c) DC sputtering a first layer contacted to at least a portion of the substrate being subjected to the RF bias in the nitrogen rich atmosphere to provide a coated substrate, the first layer comprised of a material selected from the group consisting of a carbide, a nitride, and a carbonitride of at least one of the metals selected from the group consisting of titanium, vanadium, zirconium, niobium, molybdenum, hafnium, tantalum, and tungsten; and
- d) providing a second layer comprising an iridium-containing material contacting at least a portion of the first layer to provide the electrode.

43. A method for making an electrode, comprising the steps of:

- a) providing a substrate contained in a nitrogen rich atmosphere;
- b) applying an RF bias to the substrate;
- c) DC sputtering a first layer contacting at least a portion of the substrate being subjected to the RF bias in the nitrogen rich atmosphere, the first layer comprised of a first material selected from the group consisting of a carbide, a nitride, and a carbonitride of at least one of the metals selected from the group consisting of titanium, vanadium, zirconium, niobium, molybdenum, hafnium, tantalum, and tungsten;
- e) DC sputtering a second layer contacting at least a portion of the first layer, the second layer being applied in the nitrogen rich atmosphere and comprised of a second material selected from the group consisting of a carbide, a nitride, and a carbonitride of at least one of the metals selected from the group consisting of titanium, vanadium, zirconium, niobium, molybdenum, hafnium, tantalum, and tungsten, wherein the second layer is applied without the substrate being subjected to the RF bias; and
- e) providing a third layer comprising an iridium-containing material contacting at least a portion of the second layer to provide the electrode.

44. A method for making a coated substrate, comprising the steps of:

- a) providing a substrate having a surface to be coated;
- b) contacting at least a portion of the substrate surface with a first layer of elemental titanium;
- c) contacting a second layer of titanium nitride to at least a portion of the first layer; and
- d) contacting a third layer comprising an iridium-containing material to at least a portion of the second layer to provide the coated substrate.

45. The method of claim 44 including providing the substrate comprising iridium.

46. The method of claim 44 including providing the substrate comprising about 90% platinum and about 10% iridium, by weight.

47. The method of claim 44 including providing the second layer comprising two portions, a first portion contacting the first layer being more dense than a second portion contacting the first portion.